

Partners in Ozone Protection

Many organizations are playing a pivotal role in protecting the stratospheric ozone layer—both in the past efforts they made to eliminate use of first-generation ozone-depleting substances and in their current undertakings to reduce their use of second-generation ozone-depleting substances. Leadership, investment, and innovation are the keys to these important achievements.



STRATOSPHERIC OZONE PROTECTION AWARDS

Since 1990, EPA has recognized outstanding achievement in ozone layer protection. Nearly 500 organizations, teams, and individuals from 40 countries have received Stratospheric Ozone Protection Awards for their exceptional leadership, personal dedication, and technical achievements.

Replacing Halons in Fire Protection

Before the U.S. production of halons ceased in January 1994, these chemicals were extensively used as fire extinguishing agents because they were effective and safe, and left no agent residues. Most halon-based fire extinguishing applications can now be replaced with other means of fire protection, particularly for new installations. However, halons are still employed for some essential uses, such as on civil aircraft, legacy military systems, and other important, existing installations. The halons necessary for these essential uses must be derived from existing supplies.

The **National Fire Protection Association (NFPA®)** develops voluntary standards for the fire protection industry that are adopted as industry practices in the United States and around the world. The association has developed U.S. standards for important halon replacement technologies and worked to change testing procedures and streamline the acceptance criteria for alternatives. The standards have been instrumental in supporting adoption of halon replacement agents worldwide. In addition, NFPA® has organized conferences internationally to promote the elimination of halon emissions caused by testing, training, leaks, and accidental discharges. It has also worked closely with the fire protection industry to approve a nonchemical pressure test for fire extinguishers in place of discharge testing—thereby preventing significant emissions of ozone-depleting substances.



The **Halon Alternatives Research Corporation (HARC)** was originally founded as a U.S. government partnership with industry to develop halon alternatives. It has since evolved into an industry-led effort. HARC members include the major chemical manufacturers, equipment suppliers, and servicing companies in the fire protection industry. In addition to serving as a clearinghouse and facilitating organization for research on halon alternatives, HARC has been a leader in establishing the mechanisms by which recycled halons are internationally traded in order to meet essential uses. It implemented a comprehensive halon recycling and banking program and helped to focus global attention on the need for proper recycling of halons.



PROTECTING PATIENTS AND THE PLANET

As originally designed, metered dose inhalers used CFCs to deliver vital medication (such as albuterol) to asthma sufferers. Thanks to the availability of alternative albuterol therapies, in 2005, the U.S. Food and Drug Administration removed CFC-based metered dose inhalers containing albuterol from the list of essential and exempted medical devices. As a result, hundreds of thousands of metered dose inhalers sold each year will be CFC-free. The switch is expected to result in a reduction of the consumption of CFCs by 850 metric tons per year.

3M developed the world's first safe and effective alternative to CFC-driven asthma inhalers—a technology that had remained unchanged for some 40 years. Collaborating with more than seven different companies, 3M redesigned virtually all of the inhaler's components and helped to reformulate numerous drugs to use CFC-free technology. The company has also worked worldwide to educate patients and physicians on how ozone layer protection and patients' safety can go hand-in-hand. 3M set the stage for the ultimate, substantive phaseout of CFCs in metered dose inhalers with no impact on patient safety.



Improving Commercial Refrigeration

Refrigeration and air conditioning typically use a compressed refrigerant to cool and/or dehumidify. CFCs were once used pervasively in refrigeration applications but have since been replaced by HCFCs—a transitional substitute—HFCs, or, in some cases, hydrocarbons.



Raley's® Family of Fine Stores

is a pioneer among grocery store chains in transitioning the coolants in its refrigeration systems to ozone-friendly alternatives. Raley's® is already using HFCs for all major remodels and new store construction and has successfully converted more than 70 percent of its inventory to HFCs. Raley's® is also pioneering a spirit of cooperation among grocers by sharing its technical expertise with its competitors. This exchange of information will reduce refrigerant emissions from grocery stores as they convert to alternatives and build new stores that do not rely on ozone-depleting refrigerants.

Raley's

The Coca-Cola Company

has committed to using refrigeration equipment that contains no ozone-depleting substances and to

The Coca-Cola Company

spreading the ozone protection message worldwide. Since Coca-Cola is one of the world's largest multinational corporations, these efforts are having far-reaching results. In 1994, the company stopped purchasing refrigeration equipment containing CFCs. All of the company's new vending machines and dispensing equipment use more ozone-friendly alternatives. Additionally, Coca-Cola requires the capture of all refrigerants during maintenance of these machines. The company also created an Ozone Protection Seminar for its worldwide operations, which are based in both developed and developing nations. At EPA's request, the company created a generic version of the seminar, which EPA and the World Health Organization use as a training program in developing countries. Coca-Cola has also made the program available to other companies and organizations to encourage adoption of similar environmental practices.

TRANSFORMING SOLVENT USE IN ELECTRONICS MANUFACTURING

The phaseout of ozone-depleting substances launched a global change in the way solvent users clean metal parts, deflux wiring assemblies on printed circuit boards, and remove contaminants from precision mechanical parts and assemblies. In the 1980s, two first-generation ozone-depleting substances, CFC-113 and methyl chloroform, were used extensively as solvents in industrial cleaning operations. The solvent cleaning industry conducted far-reaching research and development to reduce the demand for solvents in the first place, find appropriate ozone-friendly chemical substitutes (such as HFCs and HCFCs), and replace existing cleaning methods with substitute technologies, including aqueous cleaning and no-clean technologies.

In 1988, **AT&T®** and **Petroferm** jointly announced that AT&T®



was using a naturally derived Petroferm product to deflux electronic circuit assemblies. The announcement signaled that CFCs were no longer essential for sophisticated electronics manufacturing. AT&T® also set the first aggressive phaseout goal for ozone-depleting substances of any electronics manufacturer: 50 percent reduction by 1991 and complete elimination by 1994.

Another company, **Motorola**, also took great strides to completely eliminate the use of all ozone-depleting substances from its manufacturing processes. Motorola accomplished this goal in 1993.



MOTOROLA

// ...Eliminating the use of ozone-depleting substances was one of the most challenging technological problems ever faced, but the efforts of mankind worldwide prevailed and solutions were found. //

— Robert G. Holcomb,
Corporate Director,
Environmental Affairs, Motorola

New Technologies in Pest Management

Methyl bromide is a first-generation ozone-depleting substance, and it has long been used in agriculture and food storage to effectively control a wide variety of pests in the United States and other countries. The U.S. phaseout of methyl bromide took effect on January 1, 2005, except for allowable exemptions.

In 1993, before the phaseout of methyl bromide, the General Mills-owned **Pillsbury Company®** made the decision to eliminate as much pesticide use as possible. In just four years, the company completely eliminated its use of methyl bromide. To provide customers with safe food products, General Mills continues to use heat treatment and other non-methyl bromide materials, as well as integrated pest management programs, in high-volume flour mills and food processing plants.



Dow AgroSciences™



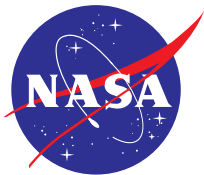
Dow AgroSciences

developed alternatives to methyl bromide that can be economic and effective. Since 1998, the company has developed alternatives that approach methyl bromide's ability to control pests and disease. These products are being used successfully on a wide variety of crops around the world. Dow AgroSciences™ has also developed new uses for sulfuryl fluoride (a pest control tool in the building fumigation industry for more than 40 years) that can replace methyl bromide in some food processing, grain milling, and stored commodity applications.

Sound Science Underscores Achievements

The National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) have been key players in advancing the world's understanding of stratospheric ozone depletion and trends.

NASA maintains satellites in various Earth orbits and conducts research to acquire a long-term, comprehensive set of environmental measurements about the Earth. NASA has also been instrumental in assessing the effects of worldwide aviation on the global atmosphere. In addition to its data gathering efforts, NASA has reduced the use of ozone-depleting substances in its space program by more than 96 percent—from more than 3.5 million pounds in 1991 to less than 150,000 pounds in 2004. To achieve such significant reductions, NASA invested years of focused effort and resources to research, test, develop, qualify, and



implement important technological advances for mission-critical uses of ozone-depleting substances.

NOAA determines the extent of depletion over Antarctica (the ozone hole), makes ground-based measurements of ozone in the atmosphere, and monitors the gases responsible for depleting stratospheric ozone. Its global network of research stations and scientists continues to play an important role in monitoring and tracking the recovery of the ozone layer.

